

REMARKS

This Amendment is in response to the Office Action dated October 6, 2006. All objections and rejections are respectfully traversed.

Claims 1-15 and 19-22 are in the case.

Claims 16-18 are withdrawn from consideration.

Claim 3 is currently amended.

New claims 21 and 22 are currently added.

Request for Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant may be reached at 617-951-3074.

Restriction Requirement

Applicant hereby affirms the election without traverse of Group 1, claims 1-15 and 19-20. Claims 16 – 18 are withdrawn from consideration without prejudice.

Claim Objections

Claim 3 is amended herein to provide proper antecedent basis for “an unaltered data content” as suggested by the Examiner.

Rejections under 35 U.S.C. §103

At paragraph 10 of the Office Action, claims 2-25 and 19-20 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application

Publication No. 2003/0158863 to Haskin et al. (hereinafter “Haskin”) in view of U.S. Patent No. 6,571,261 to Wang-Knop et al. (hereinafter “Wang-Knop”).

Claim 1, representative in part of the other rejected claims sets forth:

1. A method for separating data blocks referenced by a writable virtual disk (vdisk) from data blocks referenced only by a backing store of a storage system, the method comprising the steps of:
 - loading **blocks of the writable vdisk** from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a hole;
 - loading blocks of the backing store from a disk into the memory, the loaded blocks including a backing store indirect block having a plurality of fields, **each backing store indirect block field corresponding to a field of the writable vdisk indirect block**, one or more backing store indirect block fields having a pointer to a data block;
 - searching each field of the writable vdisk indirect block for a hole; and
 - replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field**

The Examiner indicated that paragraph [0081] of Haskin teaches “**replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing indirect field.**” Paragraph [0081] recites:

[0081] The existence of inode data within a shadow inode file within a snapshot dataset is determined in the exemplary embodiment by determining if the inode record contains null values. If the file is large enough to have indirect blocks, the indirect block pointing to the data block being updated is also copied to the snapshot dataset. The exemplary embodiments copy these metadata elements by allocating a new indirect block in the snapshot dataset, filling the indirect block with "ditto" disk addresses and then storing the address of the new (snapshot) indirect block into the snapshot inode (thereby replacing the "ditto" disk address that was stored when the inode was copied from the original into

the shadow inode file). If the file has multiple levels of indirect blocks, the process is repeated for each indirect block in the chain of indirect blocks that lead from the inode to the data block being updated. If some or all of the affected indirect blocks have already been copied into the snapshot dataset during a previous update, these indirect blocks do not need to be updated in the snapshot dataset.

Contrary to the Examiner's characterization, the referenced portion of Haskin is silent with respect to **“replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field”** as claimed. Applicant respectfully submits that the referenced portions of Haskin refer to a read-only snapshot. For example, paragraph 0114 of Hasikin recites:

[0114] The snapshot processing described above creates "read only" snapshots. Read only snapshots are snapshot data sets that capture the state of a file system at the time the snapshot is created, but do not support a user or application directly writing to or otherwise updating the data that is stored within the snapshot. Some embodiments of the present invention support writing to and updating data that was captured in previously established snapshots. Writing data to a previously established snapshot has the effect of using the file system that existed at the time when the snapshot was established.

Applicant submits that portions of Haskin that refer to writable snapshots teach away from the present invention by describing a series of ordered snapshots to facilitate update processing. Paragraph [0116] of Haskin, under subheading “Supporting Multiple Writable Snapshots,” recites:

...The resolution of data block addresses with implied references indicated by ditto values includes resolution of ditto values within the snapshot Si and any subsequent snapshots, as is described above. Ditto values encountered in snapshot Si and any subsequent snapshots are resolved **by reference to the implied data in subsequent snapshots until the actual data value is obtained from either subsequent snapshots or from the original file sys-**

tem itself. After the implied references within Si are resolved, the data blocks that contain the data to be modified are copied, at step 726, into the current snapshot Si. (Emphasis added.)

Applicant submits that the teaching by Haskin of referencing subsequent snapshots until the actual data value is obtained from either subsequent snapshots or from the original file system provides a different method of updating snapshots that, alone or in combination with Wang-Knop does not require, teach or suggest Applicant's claimed method including **replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field.**

Applicant respectfully submits, persons having ordinary skill in the art would not be motivated to combine Haskin with Wang-Knop because Wang-Knop is in a different field of endeavor. Wang-Knop is directed to the field of defragmentation. Applicant respectfully submits persons having ordinary skill in the art will recognize that the referenced steps of "hole filling" in the context of defragmentation (wherein holes are free blocks and hole filling is performed to fill free blocks with contiguous data), is unrelated to the holes found in a fields of writable vdisk indirect block associated with fields of a backing store as particularly claimed.

Applicant further submits that a combination of Haskin with Wang-Knop would not result in the present invention but would result in a process for a using shadow inodes to manage a chain of snapshots, which attempts to perform a possibly opposing function of defragmentation.

Since Haskin taken alone or in combination with Wang-Knop does not teach or suggest each and every element of claims 1-15 or 19-20, Applicant respectfully submits that the rejections under 35 U.S.C. 103(a) are improper and should be withdrawn.

All independent claims are believed to be in condition for allowance.

PATENTS
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All dependent claims are believed to be dependent from allowable independent claims, and accordingly in condition for allowance.

Reconsideration is respectfully requested.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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